ATTACHMENT D

Morning Breakout Results

August 2, 2004, ZENH Workshop

.

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PV-ZENH Workshop: Output from morning break-out groups (business model elements)

Sacramento, CA
August 2, 2004

Note: These materials represent output from the 8/2/04 PV-ZENH workshop. Proposers to the 2004 PIER ZENH RFP may use these ideas to assist them in developing business models to incorporate into their RFP responses. However, this does not imply endorsement by the California Energy Commission of any particular models. Bidders are encouraged to develop other business model concepts independently.

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ZENH Workshop Morning Breakout
Business Model Elements

Break-out group objectives

Groups were divided by stakeholder. Each group was instructed to define the three most important business models elements to reduce or eliminate the upfront cost of PV to homebuyers and address other key issues affecting adoption of residential PV.

Presentation of break-group results (disclaimer)

The following business models elements represent the output from the break-out groups. These elements represent a best attempt at capturing the main ideas and concepts developed by each group. Every effort was taken to maintain the integrity of the elements developed in the session. Therefore editing focused on obtaining clarity for a broader audience, while it did not add or alter content in an attempt to perfect or complete the elements.

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Business Model Elements

Template – one per stakeholder		
Value Proposition of ZENH	**Business Model Elements**	**Barriers**
• From the perspective of the stakeholder, ***value propositions*** can be defined as the value that PV-ZENH can bring to the stakeholder. (ie. why they should care about PV-ZENH.) • In other words, the stakeholders can ask themselves, *"What is the value I see in this for me? What do I need to get out of my involvement with PV-ZENH?"*	• From the perspective of the stakeholder, ***business model elements*** are the changes to the current business model that this stakeholder can drive in order to accelerate the adoption of PV-ZENH. • In other words, the stakeholders can ask themselves, *"What can I bring to the table?"*	• From the perspective of the stakeholder, the ***barriers*** are the things that prevent widespread PV-ZENH adoption. • In other words, the stakeholders can ask themselves, *"What are the things that are holding me back from doing more PV-ZENH?"*

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Business Model Elements

Builders/Developers

Value Proposition of ZENH	Business Model Elements	Barriers
• Provides opportunity to demonstrate environmental responsibility – create reputation as a "builder who cares" • Provides opportunities for publicity (marketing) and may result in increased name recognition • Provides clear point of differentiation in the marketplace; new home has reduced monthly energy cost, and increased power reliability • Increases ability to sell more homes to competitive consumer segments by making home more "desirable" • May be able to reduce the upfront hook-up fee (to the grid)	Each person was given 3 votes, with the ability to use more than one vote per element. The top three are listed below. Builders will team with others to: 1. Develop an integrated product – a self contained solution, an appliance (e.g., a roof substitution) 2. Influence planning and land use regulations / committees to increase efficiencies (streamline efficiencies), and possibly reduce time to market by 6-12 months 3. Team with third party integrators to provide a complete solution to the homeowner: technology solutions / advice, specifications, installation, education, training, maintenance, financing options, etc. --- • Market the benefits of PV and ZENH more aggressively, helping to drive demand with the customer • Work with planning and zoning committees to help promote Smart Growth e.g. communities that are oriented properly, promote walking and biking opposed to driving, etc • Promote the benefits of off-grid homes and stand-by power	• System cost • Doubts of whether PV is worth the added cost and hassle • Uncertainty related to availability of PV systems, components, and installers • PV systems and their warranties are not standardized; installations are often custom designed and warranties are often of varying time periods • Lack of knowledge among inspectors / zoning officials can increase permitting time for homes with PV • Trial lawyers threaten to sue builder on behalf of homeowner for product damage/performance when PV systems near their 10 year statute of limitations

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Homeowners

Value Proposition of ZENH	Business Model Elements	Barriers
• Lower energy bills • Secure and reliable energy supply • Source of emergency power • Prestige of leading technological change • Patriotic (advances national goal of energy self sufficiency) • Socially conscious investment • Potential sale of excess energy produced • Potential revenues from leasing roof space • Potential increase in home value • Increased comfort (because an energy efficient home is more comfortable) • BIPV roof tiles could be beautiful • Reduced energy costs in multi-family facilities could increase occupancy	Top Four: 1. Purchase service agreement to operate and maintain system over useful life 2. Purchase output from third party (could be regional aggregator or other 3rd party) who owns, operates and maintains PV system 3. Demand simplified transactions with other stakeholders to make getting a PV system easier 4. Purchase home in which PV is standard feature --- Other business model elements discussed (the primary focus of the group was on products and services that accelerate PV-ZEHN adoption): • Attractive BIPV roofs • Homeowners insurance that treats PV like any other household appliance • PV system designed as emergency backup power • PV system can be sold into resale market (creation of market for used equipment removes or mitigates risks of technological obsolescence and stranded value upon sale of home) • PV incentives for homeowner are linked to BIPV performance (not just watts installed) • Excess PV energy can be sold to utility • PV system value is recognized in home appraisal (need for consistent methodology and appraisal tool)	• High cost • Risk of technology obsolescence • Potential liability • Misconceptions about how the system operates • Transaction (e.g., procurement & financing) is complex and confusing • Fear of electrical equipment (failure, fire, etc.)

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Business Model Elements

PV Industry (1 of 2)

Value Proposition of ZENH	Business Model Elements	Barriers
Unlike the other groups, this group did not discuss value as it pertains to them, but rather the value proposition they can provide consumers through PV-ZENH: • Reduce system cost • Offer guaranteed energy production (via manufacturer, builder or installer) • Facilitate PV consumer financing and leased-based financing (using renewable energy credits where applicable) • Improve/increase marketing efforts to further homeowner and builder interest	Each person was given 4 votes, the top two are; 1. Package PV sales with energy efficient home construction; full-service ZENH company to compliment builders' expertise. 2. Create aesthetically pleasing PV rooftops that are easy to install and maintain with similar life expectancy to that of conventional roofing products and designs. --- • Offer hassle-free product "packages" to consumers, including more than PV equipment and energy generation (examples include thermal water heating, service agreements and warranties). • Shift revenue model from PV system sales to sales of related services; offer complimentary services, including long-term customer care and system replacement as part of original PV purchase. • Offer guaranteed energy production to PV buyers. • Develop partnerships and make PV offerings with other service providers, including broadband internet, cable television, etc. • Differentiate PV offerings for individual builder by developing proprietary products specifically for that builder.	*The group did not explicitly discuss barriers, these were inferred by the facilitators based on the group discussion:* • Initial cost is high • Product marketing is insufficient • PV energy production is not guaranteed; lack of certainty • Buyer incentives/credits (Federal, State, Local, Utility) do not sufficiently drive down PV costs to a level that equates to value • Creative/attractive financing options are not yet fully developed • Rules focused on excess energy sales from residential PV production do not offer sufficient incentives to PV consumers • Knowledge of and training in PV is not adequate amongst relevant stakeholders

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ZENH Workshop Morning Breakout
Business Model Elements

PV Industry (2 of 2)

Value Proposition of ZENH	Business Model Elements	Barriers
The group also highlighted value that other stakeholder groups could provide customers to provide incentives for PV system installation on new homes: <u>Financial Institutions</u> • During the home loan process, allow special treatment of PV-specific costs to increase a homebuyer's borrowing power; allow PV as collateral for loan • Establish renewable loan program to facilitate the payment of up-front costs associated with PV • Develop production-specific (energy) payback criteria for PV loans <u>Government</u> • Offer federal tax credits and/or accelerated depreciation incentives to homeowners with PV <u>Utility</u> • Allow PV owners to sell energy back to local utilities or the grid	• Build "energy independent" communities with PV facilities (example: solar park) supporting community load. *Participants in this group highlighted important business model elements that other stakeholders could undertake:* <u>Multiple stakeholders</u> • Create financial incentives to entice homebuyer and builder interest in PV; (e.g. by increasing volume of sales, force down price, increasing attractiveness of PV systems to homebuyers). <u>Government</u> • Streamline entitlement process ("fast-tracking") through PV incentives – entice builder participation in PV construction through expedited home turnover. Fast-track permitting for PV applications.	

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ZENH Workshop Morning Breakout
Business Model Elements

Finance (1 of 2)

Value Proposition of ZENH	Business Model Elements	Barriers
• In general, the actual risks of investing in PV aren't as high as the perceived risks • Good returns are possible with increased information about opportunities • Opportunity to develop PV-ZENH on a community-wide scale is more attractive than one-off homes (aggregation of demand) • Systems can be financed with the avoided cost of electricity	*This stakeholder group identified two distinct categories of financial models*: (1) where homeowner owns system and uses electricity, and (2) someone else owns PV system and homeowner uses electricity. *The following business model elements could be applied to either category of financial models*: • Invest in third party PV service providers. • Create bond like product to lend for new residential home with PV; opportunity to securitize PV portion of loans separately. • Develop financial instrument similar to fixed income instruments; PV systems can generate a constant stream of payments for electricity. • Monetize investments in PV through power purchase agreements or municipal bonds. • Develop financial product for performance-based contracting to utilize avoided cost financing. • Offer solar specific loans. • Issue tax exempt municipal loans for PV. • Motivate CalPERS, STRS and other players to invest in jumbo mortgages and secondary loans specifically designed for new homes with PV. • Offer insurance products to back-up investment (remove risk for owners, builders, investors).	• Lack of rating system for PV systems hinders lending and investment • Lack of effective market for renewable energy credits (RECs) • Uncertainty related to government incentives hinders investment. *This stakeholder group expressed the following concerns that were beyond the scope of their area:* • Lack of qualified system installers • Significant (and sharp) increase in demand for PV could create product shortage

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Business Model Elements

Finance (2 of 2)

Value Proposition of ZENH	Business Model Elements	Barriers
	• Consider investment in PV systems with community net metering – at neighborhood clubhouse or park – because demand for electricity is aggregated. *This stakeholder group felt that additional regulatory and financial industry pieces needed to be in place in order to facilitate investment in residential PV. With that in mind the group supported:* • Working with regulatory bodies to create rating system to provide greater certainty for investment opportunities. • Introducing rating system for investment opportunities (need BBB+ or better) • Target of ~$100 million loan portfolio to get investment rating • Assisting in establishment of more effective markets for RECs and tax credits, for example unbundle the REC from actual energy.	

ZENH Workshop Morning Breakout
Business Model Elements

Utilities (1 of 2)

Value Proposition of ZENH	Business Model Elements	Barriers
• Perceived positively by customers who value PV • Potential new products &/or services could create new revenue stream • Customers' investments in PV facilities could offset portion of utilities' infrastructure costs (generation, transmission &/or distribution) • Incremental value to shareholders based on environmental nature of investments • Potential remedy for "creep" (e.g., energy demand increases after distribution system is sized to serve a subdivision) • By aggregating demand for PV over large customer base, utility can drive down system cost because of large order	<u>Top Four</u> 1. Integrate PV into utilities' existing energy efficiency programs 2. Integrate distributed PV into utilities' power supply mix 3. Install PV on homeowners' roof and charge a fee on monthly electric bill as lease or finance payment 4. Include solar in demand response programs, since solar peak and demand peak usually match <u>Other Business Model Elements</u> • Aggregate PV transactions to access volume discounts and economies of scale • Collaborate with other stakeholder to share cost of marketing PV-ZENH • Provide long-term PV systems service (operations and maintenance) • Guarantee performance of PV-ZENH (in return for some incentive/compensation) • Offer PV as a "one size fits all" commodity (e.g., "plug and play") • Partner with PV manufacturers to develop continuous performance feedback (e.g., smart meters) • Utility owns, operates and maintains PV system • Preferential utility interconnect (hook-ups) for PV-ZENH	• Sales and property taxes increase cost PV system • Risks of PV ownership and operation create unwanted liabilities • Product warranties and guarantees are inadequate to address utilities' risks • Payback period too long; benefits not sufficient to justify level of investment • Permitting of PV remains difficult and lengthy • Risk of system failure; customer education regarding PV operations and maintenance is required • Some people perceive that PV is not aesthetically pleasing • Difficult for utility to depend on PV as a reliable power supply if customer is entrusted with operations and maintenance • CPUC regulation creates costly and and lengthy bureaucratic hurdles

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Business Model Elements

Utilities (2 of 2)

Value Proposition of ZENH	Business Model Elements	Barriers
	• Develop partnership to reduce peak demand (include PV manufacturers, builders, and others). • Dedicated resources to customer outreach and education in order to increase PV-ZENH demand. --- *Business model elements proposed for other stakeholders:* • Local governments should set standards, including: LEED, ordinances, permitting, mass procurement, incentives (Note: this is actually a local government business model element.) • Improve integration with LEED standards • Tie PV program to environmental benefits • Develop aesthetically pleasing, or not visible, PV • Insure transitions for PV system acquisition are consumer-friendly • PV manufacturer assumes responsibility of systems ownership, operation and maintenance • Build on DOE's Zero Energy Homes program	

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Local Government		
Value Proposition of ZENH	**Business Model Elements**	**Barriers**
	There was no breakout session for Local Government because of too few participants.	

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